THE STATE OF SOUTH CAROLINA

PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY
of
ALEXIS F. WARMATH

FILED ON BEHALF OF INTERVENORS Arch ENTERPRISES, LLC d/b/a McDonald's
AND CORLEY CONSTRUCTION COMPANY, LLC d/b/a BROAD RIVER LAUNDROMAT AND BROAD RIVER CAR WASH

IN THE MATTER OF

Palmetto Wastewater Reclamation, LLC d/b/a Alpine Utilities and d/b/a Woodlands Utilities

Docket No. 2014-69-S

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Alexis F. Warmath, and my business address is 1031 South Caldwell Street, Suite 100, Charlotte, North Carolina 28203.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?

A. I am testifying on behalf of Intervenors Arch Enterprises, LLC and Corley Construction, LLC d/b/a Broad River Laundromat and Broad River Car Wash.

Q. WHAT IS THE NATURE OF YOUR INVOLVEMENT IN THIS CASE?

A. I have been engaged by Callison Tighe & Robinson, LLC, counsel for Arch Enterprises, LLC d/b/a McDonald's (Arch) and Corley Construction, LLC d/b/a Broad River Laundromat and Broad River Car Wash (Corley Construction). Arch owns and operates a McDonald's restaurant located at 600 Saint Andrews Road, Columbia, South Carolina. Corley Construction owns and operates the Broad River Laundromat (Corley Laundromat) located at 3509 Broad River Road, Columbia, South Carolina, and the Broad River Car Wash (Corley Car Wash) located at 3517 Broad River Road, Columbia South Carolina. All three establishments are customers of and receive wastewater service from Palmetto Wastewater Reclamation, LLC d/b/a Alpine Utilities and d/b/a Woodland Utilities (Alpine).

I have been retained for this case as an expert consultant and witness in matters related to water and wastewater utility regulation, costs of service, rate design, and billing practices. Specifically, I have been asked to review the manner by which Alpine bills Arch, Corley Laundromat, and Corley Car Wash and the appropriateness and reasonableness of their charges as well as to recommend adjustments to the company's method of allocating costs to different types or classes of customers.

My involvement includes: the review and analysis of Alpine's Application for adjustment of rates and charges and related documents; assistance in preparing discovery questions, if needed; preparation of direct testimony; and technical assistance on issues related to cost of service, rate design and the method used to charge certain commercial customers. As a rate consultant and financial advisor for water and wastewater, I have over 20 years of experience and expertise in helping wastewater utilities develop rates and charges to equitably recover costs from different types and classes of customers.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. This testimony presents my findings and the conclusions of:

1. My review of Alpine's rate calculation methodology based upon documents presented in the rate change application (South Carolina Public Service Commission (PSC), Docket No. 2014-69-S) and associated documents provided to me and

2. My evaluation of the effect the proposed rate change would have on Arch, Corley Laundromat and Corley Car Wash. My review focused on Alpine's billing practices relative to Arch, Corley Laundromat and Corley Car Wash and certain rate design and cost allocation issues.

My review and this testimony are premised on the principle that rates should be designed in such a manner that, to the extent possible, charges to a particular customer are proportional to the cost of providing service to that customer. This is a fundamental principle for rate setting within the water and wastewater industry. This fundamental cost of service principle is well documented in the primary manuals for setting rates in the water and wastewater industry: the American Water Works Association (AWWA), Manual M1; Principles of Water Rates, Fees and Charges, and the Water Environment Federation (WEF), Manual of Practice No. 27, Financing and Charges for Wastewater Systems. My review and the testimony provided herein may require supplementation or modification after review of additional documents or consideration of further testimony that may be submitted.

Q. WHAT IS YOUR PRESENT OCCUPATION?

A. I am a professional consultant specializing in utility financial planning, rate structure design, rate setting, debt issuance support, and strategic planning. I am a vice president and co-owner of Raftelis Financial Consultants, Inc. ("RFC") where I have worked for over 20 years. I specialize in providing the following professional services to cities and towns, municipal

utilities, and regulatory agencies: utility financial planning and rate studies, determination of component and total revenue requirements, cost-of-service studies, rate structure design and implementation, demand management and conservation programs, expert witness services, utility contracts and negotiations, economic feasibility studies, and bond feasibility studies and other aspects of debt issuance support for water and wastewater utilities.

Q. PLEASE SUMMARIZE YOUR TRAINING AND EXPERIENCE.

A. I have 20 years of experience as a financial and rate consultant primarily for government-owned water and wastewater utilities. My formal education consists of a B.A. in Economics from Duke University; an M.B.A. from the Fuqua School of Business at Duke University; and an Masters of Environmental Management (M.E.M.) from the Nicholas School of the Environment at Duke University. I started my career as a management consultant with a large public accounting firm where I worked on assignments related to financial forecasting, cost allocation studies and investment tax credit studies.

After returning to school for a second masters degree in Environmental Management, I joined RFC in 1993 as the second full time professional consultant, other than the owner, Mr. George A. Raftelis. Since that time the firm has grown to approximately 45 professional consultants with 6 offices located in 5 states. We provide financial consulting services to primarily government-owned water and wastewater utilities throughout the

United States, plus a number of international clients. Our firm has provided assistance to over 500 water and wastewater utilities, and I have personally participated in well over 100 different utility financial planning and rate studies while working at RFC.

I have provided expert witness testimony on several occasions before different state public utility commissions on matters directly related to utility financial planning, revenue requirements, and cost of service studies and rate design. I have served as the sole arbitrator for a wholesale wastewater rate dispute in Pickens County, SC.

For over 15 years I have been an active member of the American Water Works Association (AWWA) and its regional affiliate—the North Carolina Chapter of the AWWA. I have served on the AWWA's Rates and Charges Committee for approximately 14 years and have been a contributing author in revising and updating two editions of the AWWA publication entitled *Principles of Water Rates, Fees, and Charges* (Manual M1), which was republished in its sixth edition in 2012. I was also a contributing author to the initial edition of the AWWA Manual M54 – Developing Rates for Small Systems, published in 2004. For additional information regarding my education, training, and experience, please see my resume, attached hereto as **Exhibit 1**.

Q. BEFORE GETTING INTO THE DETAILS, PLEASE SUMMARIZE YOUR PRINCIPAL FINDINGS AND CONCLUSIONS.

A. According to Alpine's rate application submitted to the PSC, Alpine seeks to bill Arch and Corley Construction so that Arch and Corley Construction and its other customers are billed based upon the number of Single Family Equivalents ("SFE") assigned to each commercial customer. The number of SFEs for each commercial customer was determined by using the South Carolina Department of Health and Environmental Control ("DHEC") Guidelines for Unit Contributory Loading for Domestic Wastewater Treatment Facilities ("Guidelines") found at 25 S.C. Code Ann. § 61-67.

The restaurant owned by Arch is classified as a fast food restaurant, while the Corley Laundromat is classified as a laundry and the Corley Car Wash is classified as a car wash under the Guidelines. Calculating wastewater charges for Arch and Corley Construction, and in fact all of Alpine's commercial customers, based on the Guidelines' loading factors results in wastewater charges that are excessive, inequitable, and arbitrary because the wastewater charges are not reasonably related to the cost of providing service.

For the vast majority of wastewater utilities, water usage records provide the basis for assessing wastewater user rates and charges. This approach is generally regarded as the most efficient and equitable way to allocate costs to individual customers in proportion to the actual cost of serving each customer. The method is based on monthly meter readings and does not take into account peak day usage or any measure of maximum flows since this information is not captured in the monthly billing data. In fact,

the most common wastewater rate structures, by a huge margin, are set up to recover the majority of costs from a uniform volumetric rate assessed to all customers based on metered water usage. In other words, the same volumetric rate is typically charged to all users regardless of customer type or usage levels in recognition of the fact that the cost to provide wastewater collection and treatment services per gallon of wastewater generated is essentially the same for most customers. In general, any differences in the strength or concentration of pollutants in the wastewater has an insignificant impact on treatment costs except in the case of certain types of industrial customers that generate particularly high-strength wastes and are, as a result, separately monitored and assessed high strength surcharges as part of an industrial pretreatment program (IPP). Restaurants, car washes, and laundromats would not normally be included in this category of IPP customers.

I have reviewed water billing records for Arch, Corley Laundromat, and Corley Car Wash for the period July 2013 through June 2014. According to these water billing records, Arch, Corley Laundromat, and Corley Car Wash utilize approximately 58,200 gallons, 181,200 and 80,050 gallons of water per month, respectively.

Now, let’s compare that actual water usage to the wastewater discharge these customers would be charged for based on the Guidelines and methodology adopted by Alpine. Arch has been assigned 112.1 SFEs of equivalent usage. Because the Guidelines specify 400 gallons per day of

usage for each SFE, this translates into approximately 44,480 gallons per day or approximately 1,334,500 gallons per month for Arch. This is approximately 22.9 times their actual average monthly water usage.

Corley Laundromat has been assigned 40.0 SFEs which translates into approximately 16,000 gallons per day or approximately 480,000 gallons per month. This is approximately 2.6 times their actual monthly water usage.

Corely Car Wash has been assigned 22.5.00 SFEs which translates into approximately 9,000 gallons per day or approximately 270,000 gallons per month. This is approximately 3.4 times their actual average monthly usage.

Under this methodology, all three of these customers would be charged for significantly more wastewater discharge than they are actually contributing to the wastewater system. Such a rate calculation is not based on any reasonable comparison between the cost to serve Arch, Corley Laundromat, and Corley Car Wash and other customers that return the same level of wastewater to the sewer system. Such divergence between cost of service and billed amounts is inequitable and unreasonable and based upon the application of arbitrary wastewater discharge estimates.

Q. DO YOU HAVE ANY GENERAL CONCERNS OR RESEVATIONS ABOUT ALPINE'S PROPOSED USE OF THE GUIDELINES FOR BILLING ARCH, THE CORLEY LAUNDROMAT, AND THE CORLEY CAR WASH?

A. Yes, I do. Based on by review of the available information, the most significant factor causing this discrepancy between the assigned number of SFEs, and the implied level of usage associated with this assignment, and actual levels of water usage for Arch, Corley Laundromat, and Corley Car Wash, is the reliance on the Guidelines to determine the number of SFEs assigned to non-residential or commercial customers. The use of the Guidelines is inappropriate and inequitable for the following reasons:

- The Guidelines were developed to be used for the design of wastewater system facilities and not to estimate average flow from customers; the two purposes are completely different.
- The Guideline's unit contributory loading factors are estimates of peak or maximum daily contributions per unit measure and do not represent average or typical use, which is the industry standard approach for developing wastewater user rates and charges.
- The Guidelines are outdated having been originally issued over 40 years ago and are no longer consistent with actual usage patterns and usage levels demonstrated by many, if not most, of the customer types identified in the Guidelines.
- As described below, there are other more appropriate and accurate billing methods available. For example, customers can be billed for their wastewater use based on metered water

consumption or based on SFEs derived from historical billing records and actual usage patterns.

Q. WHY SPECIFICALLY IS IT INAPPROPRIATE FOR ALPINE TO UTILIZE THE GUIDELINES FOR WASTEWATER BILLING?

A. First, when questioned about the use for the Guidelines for developing wastewater user rates and charges, the SC Department of Health and Environmental Control provided a letter confirming that the Guidelines were developed to be used for the design of wastewater system facilities and not to estimate average flow from customers. I believe a copy of this letter has already been provided to all parties.

In addition, a simple set of calculations quickly demonstrates that the number of SFEs identified in the rate calculation methodology, and the flow associated with those SFEs in the Guidelines, provides an unrealistic estimate of total system flows. The rate calculations developed for the Application indicate a total of approximately 9,150 SFEs for the entire system, including all customer types. Based on the Guidelines, this would suggest of level of flow significantly greater than the treatment capacity of the Alpine system. By multiplying 9,150 SFEs times the assigned usage level of 400 gallons per day per SFE, this would suggest flows of approximately 3.66 million gallons per day (MGD). Since the Alpine system is only authorized by DHEC and capable of treating a maximum of 2.288 MGD this level of flows would represent a significant violation of Alpine's discharge permit. In fact, if Alpine's flows had ever reached even 90% of their authorized or permitted

maximum, they would have been required by DHEC to start expanding their plant to handle these flows. Because of this disconnect between actual flows at both the level of the individual customers and in terms of the total system capacity, it is readily evident that the Guidelines do not provide a reasonable and effective way to estimate customer usage or allocate costs among the various types of customers.

One reason for this result is that the Guidelines are based on maximum flow levels and not average flow levels. This may be appropriate for designing wastewater infrastructure and treatment facilities, but is not appropriate for developing user rates and charges. As noted above, the standard, industry accepted approach for setting wastewater rates and charges is based on average monthly water usage as a proxy measure for wastewater flows, not peak or maximum potential flow levels. And I would add that given the age of these Guidelines and the documented changes in customer water usage patterns and usage levels that have occurred over the last two decades that these maximum flow levels are significantly over-stated for many, if not most, of the customer types listed in the Guidelines. In fairness, it should also be noted that for some customer types, the Guidelines may actually understate the usage levels that are currently being generated. This lack of correlation between the usage levels assumed in the Guidelines and actual usage levels currently demonstrated for most customers types, including single family residential customers, results in allocations of SFEs that are unrealistic and essentially arbitrary.

To take this analysis a little further, it is instructive to look at how the results are changed if you take a more realistic approach for estimating wastewater flows based on the assigned number of SFEs identified for the Alpine system. Based on our experience working with hundreds of utilities, including several South Carolina clients, a more reasonable estimate of average monthly usage for a typical residential customer in the Columbia area would be in the range of 5,000 gallons per month, or approximately 166.67 gallons per day. In order to allow for some additional leeway for peak flows, seasonal usage, and inflow and infiltration entering the wastewater system, it would not be unreasonable to increase this number by approximately 10% to 5,550 gallons per month or 185 gallons per day per SFE. Multiplying this usage level times the 9,150 SFEs assigned to the system generates an estimate flow level of approximately 1.670 MGD, which is much more consistent with actual system capacity.

This analysis clearly demonstrates that the use of the Guidelines, which are based on peak usage numbers, is not appropriate and is a significant factor in generating the charges for Arch, Corley Laundromat, and Corley Car Wash that are inconsistent with their actual usage levels and are, therefore, each inequitable and unreasonable.

Q. WERE YOU ASKED TO REVIEW OR EVALUATE ANY OTHER ASPECTS OF THE METHODOLOGY USED BY ALPINE OR THE USAGE FACTORS APPLIED TO SPECIFIC CUSTOMER TYPES?

Yes, I was. Based on information developed in a prior rate case, Alpine is using an adjusted factor to determine water use for restaurants with drive-thru facilities. The Guidelines specify 40 gallons of water usage per car using the drive-thru. In the earlier rate case, Palmetto Utilities introduced a new factor of 10 gallons per car. Palmetto provided a formula demonstrating how they came up with this new factor in the Direct Testimony of Edward R. Wallace, SR., CPA (Docket No. 2014-69-S) that I was specifically asked to review.

The formula shows several interesting results. It indicates that water use per ERC (equivalent residential customer, which I assume is the same as an SFE) is 150.87 gallons per day which is determined by dividing the average daily flow at the WWTP (2,500,000 gallons) by the total number of ERCs in the system (16,571). This is very much in line with what I would expect for a normal wastewater utility where the majority of customers are residential customers, which is well below the 400 gallons per day used in the Guidelines. The formula also calculates a usage level per car served at a drive-thru of approximately 3.03 gallons per car, based on survey information gathered from fast food restaurants with drive-thru windows located within the relevant service area. They then take the gallons per day per ERC and divide that into the 400 gallons per day per SFE specified in the Guidelines. Essentially, this seems to be done in an effort to scale the actual usage information up to be consistent with the assumed usage levels used in the Guidelines. The only reason I can think to do this would be to try to convert

the average usage per day per SFE into a peak usage number, consistent with the Guidelines, to account for additional flows associated with wet weather events or inflow and infiltration entering the wastewater collection system to arrive at an estimate of maximum day flows. However, we have already discussed that this factor of 400 gallons per day per SFE significantly overstates the true level of expected flows for a maximum day and is not appropriate for assigning SFEs to customers for sewer billing purposes. In addition, the formula also includes a second "peak flow factor" of 120% that is applied on top of the adjustment to equate the flows to the assumptions used in the Guidelines. I can think of no valid justification for applying this second factor.

It is also interesting that the formula also seems to take the total usage for the surveyed fast food restaurants and converts this to a usage level per car served at the drive-thru window without any consideration of the number of seats in the restaurant. This seems to suggest that not only is the number of gallons used per car (3.03 gallons per car) significantly lower than even the adjusted factor of 10 gallons per day per car applied by Palmetto Utilities, but that any additional usage assigned based on the number of seats in the restaurant only serves to further overestimate the actual flows for a fast food restaurant and the cost impact on the wastewater system of this type of customer.

Based on these observations, in my opinion the formula does not provide a reasonable basis for adjusting the factor used to estimate flows

based on the number of cars served at the drive-thru window for a fast food restaurant, and provides further evidence that the use of the Guidelines, even as adjusted, is inappropriate, inequitable, and arbitrary.

Q. DO YOU HAVE A RECOMMENDATION AS TO HOW THE SFE FORMULA SHOULD BE MODIFIED TO MORE ACCURATELY REFLECT ACTUAL USAGE OF THE TWO MCDONALD'S CUSTOMERS, IF THE COMPANY PREFERS TO STAY WITH THIS ESTIMATING METHODOLOGY?

A. Yes, I do. Clearly the use of the Guidelines for estimating flows has significant flaws. A much more accurate and equitable approach would be to use actual billing information to estimate usage levels for each customer. It is my understanding that Alpine has indicated that it is not willing to try to acquire monthly billing data from the City of Columbia ("City") and to generate bills based on actual usage each month. However, it is my understanding the they are using this exact methodology for their sister company, Palmetto of Richland County.

As an alternative, it would be possible and significantly more equitable to secure historical billing information from the City and to develop estimated usage levels for each type of customer based on these usage records. Usage levels tend to change slowly over time for different types of customers and this type of analysis would only have to be updated every 3 to 4 years to provide acceptable levels of accuracy; or perhaps each time an application for a rate adjustment was submitted to the PSC.

Given adequate lead time, it is highly likely that the City could provide usage levels for each of Alpine's customers, including information to group these customers by customer type or class. From this information it would be a very straightforward exercise to calculate the average monthly usage for a typical residential customer. This would then become the basis for the gallons of average monthly usage assigned to each SFE. All residential customers would be charged for one SFE, the same as the current methodology. Then the number of SFEs assigned to non-residential customers would be calculated by dividing their monthly usage levels by the gallons assigned to each SFE. This information would also generate the number of SFEs for the total system which would be divided into the amount of revenue requirements allowed by the PSC to determine the rate or amount charged per SFE for all customers. I would also add the further suggestion that all non-residential customers be charged for at least one SFE even if their usage fell below the usage for an average residential customer. As new customers are added to the system or as customers disconnect and are replaced by other customer types, it should not be too difficult to estimate the expected usage for the new customer, expressed in terms of SFEs, once the level of usage for other similar types of customers has been established. It certainly wouldn't be any more difficult than estimating the number of cars passing through a restaurant or car wash, or the number of seats in a particular establishment, or several of the other factors identified in the Guidelines for estimating wastewater flows.

The number of SFEs assigned to each customer would remain unchanged until the next time an analysis was completed to update the usage information for all customers. However, there should also be an appeal process in place whereby customers could petition for an adjustment in the number of SFEs assigned to their business by providing copies of their water billing records over some reasonable time period to demonstrate that their usage had changed.

Q. WHAT IMPACT WILL YOUR PROPOSED CHANGES HAVE ALPINE'S REVENUE?

A. If we assume, for the sake of argument, that the average monthly flow for a typical residential customer is 5,550 gallons per month, as suggested above, then the appropriate number of SFEs assigned to Arch, Corley Laundromat, and Corley Car Wash would be calculated by dividing their monthly flows by this number. This would result in approximately 10.5 SFEs assigned to Arch, approximately 32.6 SFEs assigned to the Corley Laundromat, and approximately 14.4 SFEs assigned to the Corley Car Wash, compared to the original adjusted assignments of 112.1, 40.0 and 22.5 SFEs, respectively. As a result, at the same monthly charge per SFE as is currently being requested ($35.50/SFE), Arch's bill would be reduced from approximately $3,980/month to $373/month, the Corley Laundromat bill would be reduced from approximately $1,420/month to $1,160/month, and the Corley Car Wash bill would be reduced from approximately $799/month

to $512/month. This results in reduced revenues to Alpine of approximately $4,155 per month or approximately $49,900 per year. Based on a Service Revenue amount allowed by the PSC of approximately $3,917,000, this represents a decrease in expected revenues of less than 1.5 percent. In order to recover this lost revenue from the entire customer base, assuming 9,150 SFEs, the charge per SFE would have to be increased by approximately $0.42, from $35.50 per SFE to $35.92 per SFE. So the impact on Alpine, and potentially on other customers, is fairly small and does not cause a significant impact on Alpine's expected income level or financial condition. However, it is important to reiterate that this analysis is based upon an assumed level of usage of 5,550 gallons per month per SFE, and is not based on a full analysis of actual usage data. In addition, the estimate of lost revenues of $49,900 does not include potential revenue losses or gains from other commercial or multi-family customers that may occur as a result of using the average monthly water use approach for estimating and assigning SFEs.

There was not enough time and detailed billing information was not available to determine the potential impacts on other non-residential customers. It is likely that other commercial and multi-family customers would experience varying impacts that could result in some customers experiencing bill increases and some experiencing bill reductions. The data necessary to determine the revenue and bill impacts could be obtained with additional time.

Q. MR. WARMATH, DO YOU ANTICIPATE HAVING TO FILE OR PROVIDE SUPPLEMENTAL TESTIMONY IN THIS CASE?

A. Yes, I do. My review, answers, and the testimony provided herein may require supplementation or modification after review of additional documents or consideration of further testimony that may be submitted. Thus, it may be necessary to produce a supplement to this pre-filed direct testimony or to supplement the same at the hearing, and I would like to reserve the right to do so.

Q. MR. WARMATH, DOES THAT CONCLUDE YOUR TESTIMONY AT THIS TIME?

A. Yes, it does.

EXHIBIT 1

Alexis F. Warmath
Vice President, Raftelis Financial Consultants, Inc.

Technical Specialties

- Utility financial planning studies
- Utility cost of service and rate structure studies
- Bond feasibility studies/debt issuance support
- Economic feasibility studies (Regionalization/consolidation; Reuse system implementation)
- Capital recovery fee studies
- Wholesale rate studies and dispute resolution

Professional History

- Raftelis Financial Consultants, Inc.: Vice President (1994-present)
- Wetlands Center: Duke Research Associate (1992)
- Ernst & Whinney: Senior Consultant (1983-1987)

Education

- Master of Environmental Management – Nicholas School of the Environment, Duke University (1993)
- Postgraduate studies in mathematics - University of North Carolina at Charlotte (1990 – 1991)
- Master of Business Administration – Fuqua School, Duke University (1983)
- Bachelor of Arts in Economics - Duke University (1977)

Professional Memberships

- American Water Works Association – Rates and Charges Committee

Publications

- Contributing Author: *Water and Wastewater Finance and Pricing – A Comprehensive Guide*, George A. Raftelis. Chapter 10: Water and Wastewater Pricing Process, 2005 (3rd Edition). Chapter 6: Water and Wastewater Rate Setting Process (4th Edition)
- Contributing Author: AWWA *Manual M1 – Principles of Water Rates, Fees and Charges*, 2012 (6th Edition)
- Contributing Author: AWWA *Manual M54 – Developing Rates for Small Systems*, 2004 (1st Edition)

Profile

Mr. Warmath joined RFC in 1994 and, being the second full-time employee hired by the firm, has participated in a wide variety of projects, covering all of the service areas offered by RFC. He has focused primarily on rate and financial planning studies and bond feasibility studies. Mr. Warmath has been involved in a number of studies involving transition to new rate structures to address specific pricing objectives, including promotion of water conservation. Mr. Warmath's expertise in the theory and practice of utility rate analysis is demonstrated by his position as a member of the Rates and Charges Committee of the AWWA where he has served for over 12 years. Mr. Warmath has significant experience in developing wholesale rates, including serving as the sole arbitrator in a wholesale rate dispute in Pickens County, South Carolina. He has extensive experience in conducting bond feasibility studies and other aspects of debt issuance support, and serves as the practice area manager for these types of studies within the firm.

Project Experience – Utility Rate and Financial Planning Studies, Southeastern U.S.

- City of Canton (GA) - Water and Wastewater Rate Study
- Rockdale County (GA) – Water and Wastewater Rate Study

- Gainesville/Hall County (GA) - Outside City Rate Differential Study
- City of Griffin (GA) – Water and Wastewater Rate Study, Regionalization Analysis
- City of Asheville (NC) - Water Rate and Financial Planning Study
- Brunswick County (NC) - Revenue Bond Feasibility Study and Water and Sewer Rate Study
- City of Burlington (NC) - Water and Sewer Rate Study and Bond Feasibility Study (2)
- Town of Cary (NC) - Revenue Bond Feasibility Study (2), High Strength Surcharge Study, **Impact Fee Study**, Revenue Bond Feasibility Study, Water and Wastewater Rate Study, and Water Conservation Master Plan
- City of Concord (NC) – Revenue Bond Feasibility Study, Wholesale Rate Study, Water and Wastewater Rate Study, and **Water Development Fee Study**
- City of Concord/City of Albemarle (NC) - Economic Feasibility and Valuation Assessment
- City of Durham (NC) - Conservation Rates Study and Water and Sewer Rate Study
- Durham County (NC) - Revenue Bond Feasibility Study and Sewer Rate Study
- Fayetteville Public Works Commission (NC) - Utility Cost of Service and Rate Structure Study, **Development Fee Study**, High Strength Surcharge Study
- Greenville Utilities Commission (NC) - Bond Feasibility Study and Water and Sewer Rate Study
- Hallsdale-Powell Utility District (TN) - Water and Wastewater Rate and Financial Planning Study
- Joint Municipal Water and Sewer Authority (SC) – Water and Sewer Rate Study, Bond Feasibility Study (2), Wholesale Sewer Rate Analysis and Dispute Resolution
- Town of Kinston (NC) - Water and Wastewater Rate Study
- Metropolitan Government of Nashville and Davidson County Water Services (TN) – Water and Sewer Rate and Cost of Service Study, Annual Budget and Debt Coverage Reviews, Bond Feasibility Study (2) and other Debt Issuance Support, Wholesale Sewer Rate Study, High Strength Surcharge Study
- Pickens County (SC) - Wholesale Sewer Rate Arbitration
- Town of Oak Island (NC) - Bond Feasibility Study (2), Water and Wastewater Rate Study
- Piedmont Triad Regional Water Authority (NC) - Bond Feasibility Study
- City of Pompano Beach (FL) - Rate and Financial Planning Study for Water, Sewer, Reuse and Stormwater Utilities, Lauderdale by the Sea Wholesale Rate Study, Miscellaneous Fees Study, Water and Wastewater Capacity Fee Study, and Annual Rate Updates
- City of Raleigh (NC) – Financial Planning and Conservation Rate Study
- City of Sanford (NC) - Water and Wastewater Rate Study and Bond Feasibility Study
- Union County (NC) - **Impact Fee Study**, Bond Feasibility Study
- White House Utility District (TN) - Water and Sewer Rate Study and Wholesale Water Rate Assistance

Project Experience – Regionalization Studies

- South Fulton Water Authority (GA) – Economic Feasibility Study, Debt Issuance Support
- City of Creedmoor (NC) – Economic Feasibility Study
- Watauga River Regional Water Authority (TN) - Economic Feasibility Study for Creation of New Authority, Phases I and II
- Water and Sewer Authority of Cabarrus County (NC) – Wholesale Sewer Rate and Impact Fees Studies, Retail Service Consolidation Study
- Neuse Regional Water and Sewer Authority (NC) – Economic Feasibility Study and Bond Feasibility Study
- Paducah-McCracken Joint Sewer Authority (KY) – Rate Merger Study for new Authority.

Project Experience – Expert Witness and Technical Expert

- St. Johns County (FL) – Served as rate and pricing expert in contract dispute with JEA.
- Masthope Property Owners Council (PA) – Served as expert witness in preparing testimony seeking rate relief for the Masthope POC in a rate filing submitted by Aqua Pennsylvania with the PA Public Utilities Commission

Project Experience – Wholesale Contract Negotiations and Dispute Resolution

- Griffin (GA) – Subject expert in wholesale rate negotiations
- Joint Municipal Water and Sewer Authority (SC) – Served as technical advisor and rate setting expert in settling a wholesale sewer rate dispute and finalizing a new wholesale contract.
- Oakboro (NC) – Served as technical advisor and facilitator in negotiations between four local jurisdictions to establish a new inter-local agreement for wholesale sewer treatment service
- Pompano Beach (FL) – Developed new wholesale rates for wastewater treatment and reuse services
- White House Utility District (TN) – Served as technical expert in negotiating a new wholesale water contract
- Metro Water Services, Nashville (TN) – Developed new wholesale rate setting methodology
- Greenville Utilities Commission (NC) – Developed wholesale rate methodology for water and sewer services and technical advisor for drafting financial components of new contracts
- Greenville Water (SC) – Developed wholesale rate methodology for water and sewer services and technical advisor for drafting financial components of new contracts
- Concord (NC) – Developed new wholesale rate methodology for water service
- Creedmoor (NC) – Subject expert in wholesale rate negotiations
- Webb Creek Utility District (TN) – Expert witness in retail rate dispute

Recent Presentations at Industry Association Conferences

- "Re-Thinking How We Use Water – The Role of Pricing"; NC Green Industry Council, Aug. 2012
- "The Economics of Reclaimed Water Systems"; NC AWWA-WEA Seminar – Facing Water Reuse Challenges, March 2011
- "Using Water Rates as a Conservation Incentive"; NC AWWA-WEA Water Conservation Workshop, Oct. 2009
- "Conservation Pricing: Recent Trends and Lessons Learned"; Florida AWWA Conference, Dec. 2009